

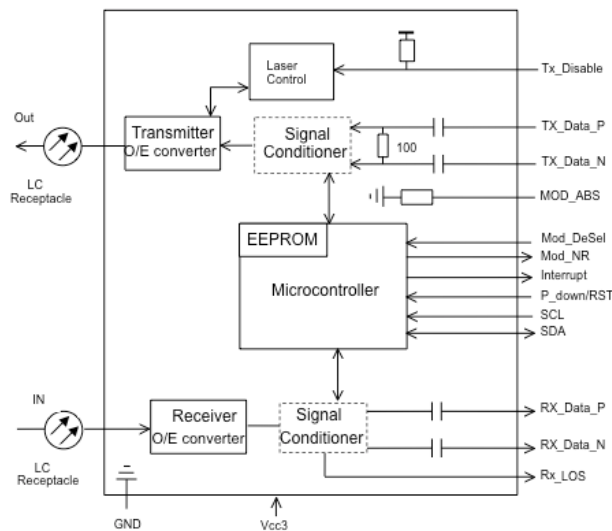


DWDM Tunable XFP Transceiver 11Gb/s 80km, 50GHz ITU-T P/N 4ZR0A0x-TNBL



Description

Menara Networks' 4ZR0A0x-TNBL transceivers are designed for use in 10Gb/s to 11.1Gb/s DWDM links up to 80km over single mode fiber. The XFP is fully tunable over the entire C-Band and supports 50GHz spacing. The XFP module supports 10GBASE-ZR and -ZW applications along with SONET OC-192 LR-2 and SDH STM-64 ITU-T G.959.1 P1L1-2D2 applications for Ethernet Switches, IP Routers or SONET/SDH optical interfaces. Digital Optical Monitoring interfaces are provided via the XFP standards compliant I²C interface.

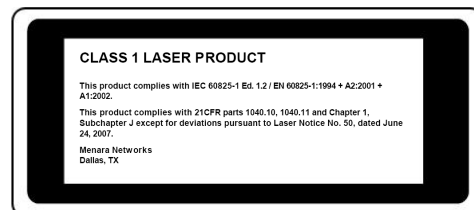


Applications

- Fully Tunable 50GHz DWDM XFP
- 10GBASE-ZW/ZR 10G Ethernet
- 10GB Fibre Channel
- SONET OC-192 LR-2
- SDH STM-64 ITU-T G.959.1 P1L1-2D2
- Ethernet Switch or IP Router Interconnect

Features

- Hot-pluggable XFP footprint
- 50GHz DWDM ITU-T tunable
- Support 9.95Gb/s to 11.1Gb/s bit rates
- 80km 50GHz tunable laser
- APD photodiode receiver
- -5°C to +70°C
- Duplex LC fiber connectors
- 10GBASE-ZR/ZW
- SONET OC-192 LR-2
- SDH STM-64 ITU-T G.959.1 P1L1-2D2
- Full Digital Optical Monitoring
- Metal enclosure for lower EMI
- Complies with RoHS directive (2002/95/EC)
- Compliant with XFP Electrical and Mechanical MSA INF-8077
- Laser Class 1 IEC/CDRH compliant
- Links of 80 km with 9/125 μm single mode fiber (SMF) of maximum interconnect distances



Transmitter E-O Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	-	9.95	10.3125	11.1	Gb/s	-
Center Wavelength	λ	1528.38	-	1565.50	nm	ITU-T
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Wavelength Stability after Startup	$\Delta\lambda_{EOL}$	$\lambda_i - 25$	-	$\lambda_i + 25$	pm	-
Average Optical Output Power	Po	-1	-	+3	dBm	1
Extinction Ratio	Er	9.0	-	-	dB	-
Differential data Inputs swing	Vinpp	120	-	820	mV	2
Output Power After Disabled	-	-	-	-30	dBm	-
Output Eye Diagram	Compliant with ITU-T and IEEE recommendation MASK					

Receiver O-E Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	-	9.95	10.3125	11.1	Gb/s	-
DWDM Wavelength Range	-	1528.38	-	1565.50	nm	-
Channel Spacing	$f_{spacing}$	50			GHz	-
Sensitivity @ 9.95 to 10.3Gbps	Sen1			-24	dBm	1
Sensitivity @ 11.1Gbps	Sen1			-23	dBm	1
Saturation	Ps	-7	-	-	dBm	1
Optical Path Penalty @ 9.95Gbps 1600ps/nm	OPP ₁			2	dB	1
Optical Path Penalty @ 10.7Gbps 1600ps/nm	OPP ₂			3	dB	1,3
Optical Path Penalty @ 11.1Gbps 1450ps/nm	OPP ₃			3	dB	1,3
LOS Asserted	-	-37	-	-	dBm	High level: Alarm
LOS De-Asserted	-	-	-	-30	dBm	
LOS Hysteresis	-	0.5	-	-	dB	

Notes

1. Measured at PRBS 2³¹-1, NRZ, BER≤10⁻¹²
2. Internally AC coupled
3. With optimized CDR decision threshold

Ordering Information

Part Number	ROHS Compliant	Operating Case Temperature
4ZR0A0x-TNBL	ROHS-6	-5 ~ +70°C

- x = J for Juniper
- x = C for Cisco
- x = A for Alcatel
- x = O for Cisco ONS

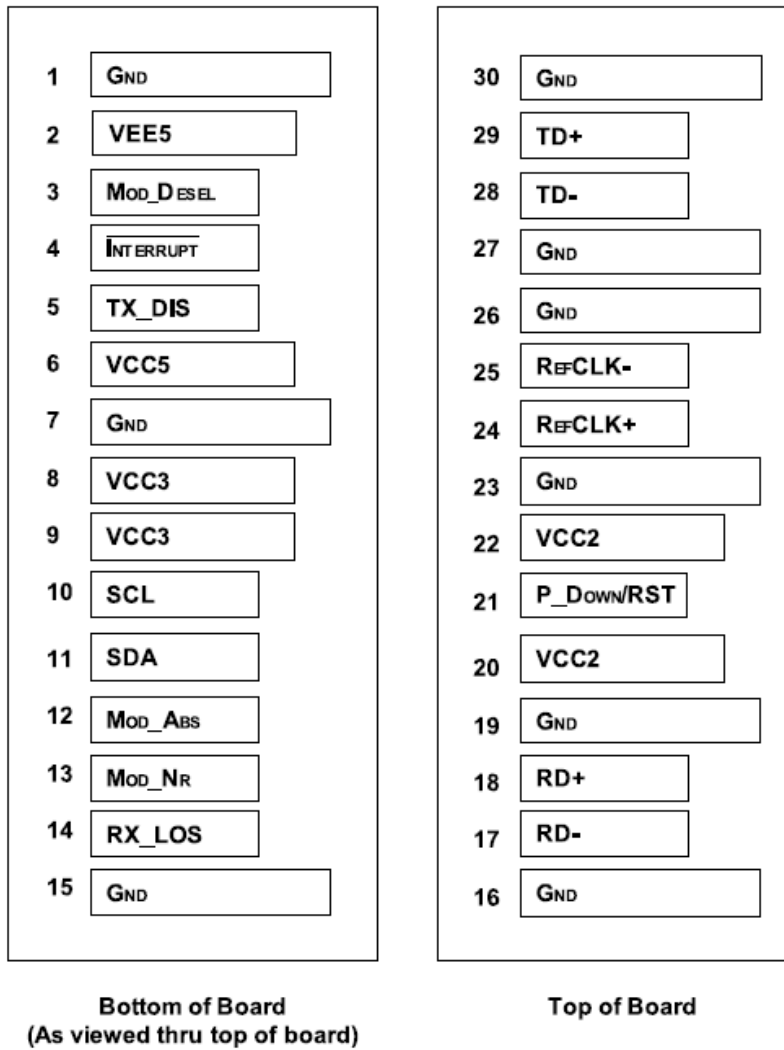
DOM Alarm Thresholds and I2C Locations

All Alarm Thresholds for OTN XFP are configured at the manufacturer and cannot be configured through the I2C interface (i.e. thresholds are not provisionable). Alarm thresholds for each DOM parameter are located in the following registers.

Threshold Value Register	Latched Alarm	Threshold Size (Bytes)	Name
02-03	80.7	2	Transceiver Temp High Alarm
04-05	80.6	2	Transceiver Temp Low Alarm
06-07	82.7	2	Transceiver Temp High Warning
08-09	82.6	2	Transceiver Temp Low Warning
10-17	N/A	8	Reserved
18-19	80.3	2	Laser Bias Current High Alarm
20-21	80.2	2	Laser Bias Current Low Alarm
22-23	82.3	2	Laser Bias Current High Warning
24-25	82.2	2	Laser Bias Current Low Warning
26-27	80.1	2	Laser Output Power High Alarm
28-29	80.0	2	Laser Output Power Low Alarm
30-31	82.1	2	Laser Output Power High Warning
32-33	82.0	2	Laser Output Power Low Warning
34-35	81.7	2	Receive Optical Power High Alarm
36-37	81.6	2	Receive Optical Power Low Alarm
38-39	83.7	2	Receive Optical Power High Warning
40-41	83.6	2	Receive Optical Power Low Warning
N/A	86.7	N/A	5V High Alarm
	86.6		5V Low Alarm
	86.5		3.3V High Alarm
	86.4		3.3V Low Alarm
	86.3		1.8V High Alarm
	86.2		1.8V Low Alarm
	86.1		-5V High Alarm (Not Used)
	86.0		-5V Low Alarm (Not Used)
	87.7		5V High Warning
	87.6		5V Low Warning
	87.5		3.3V High Warning
	87.4		3.3V Low Warning
	87.3		1.8V High Warning
	87.2		1.8V Low Warning
	87.1		-5V High Warning (Not Used)
	87.0		-5V Low Warning (Not Used)

Host Connector Specifications

The XFP PCB host electrical connections are shown in the figure below.



XFP PCB Electrical Connections

Pin No	Name	Logic	Function	Notes
1	GND		Electrical Ground	1
2	VEE5		Optional -5.2V power Supply (Not used)	
3	Mod_DeSel	LVTTL-I	Module De-select; When held low allows module to respond to 2-wire serial interface	
4	Interrupt	LVTTL-O	Interrupt; Indicates presence of an important condition which can be read over the 2-wire serial interface	2
5	Tx_DIS	LVTTL-I	Transmitter Disable; Turns off transmitter laser output	
6	VCC5		+5V Power Supply	
7	GND		Module Ground	1
8	VCC3		+3.3V Power Supply	
9	VCC3		+3.3V Power Supply	
10	SCL	LVTTL-I/O	2-Wire Serial Interface Clock	2
11	SDA	LVTTL-I/O	2-Wire Serial Interface Data Line	2
12	Mod_Abs	LVTTL-O	Indicates Module is not present. Grounded in the Module	2
13	Mod_NR	LVTTL-O	Module Not Ready; Indicating Module Operational Fault	2
14	RX_LOS	LVTTL-O	Receiver Loss Of Signal Indicator	2
15	GND		Module Ground	1
16	GND		Module Ground	1
17	RD-	CML-O	Receiver Inverted Data Output	
18	RD+	CML-O	Receiver Non-Inverted Data Output	
19	GND		Module Ground	1
20	VCC2		+1.8V Power Supply	3
21	P_Down/RST	LVTTL-I	Power down; When high, requires the module to limit power consumption. 2-Wire serial interface must be functional in the low power mode. Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22	VCC2		+1.8V Power Supply	3
23	GND		Module Ground	1
24	RefCLK+	PECL-I	Reference Clock Non-Inverted Input, AC coupled on the host board (not required)	
25	RefCLK-	PECL-I	Reference Clock Inverted Input, AC coupled on the host board (not required)	
26	GND		Module Ground	1
27	GND		Module Ground	1
28	TD-	CML-I	Transmitter Inverted Data Input	
29	TD+	CML-I	Transmitter Non-Inverted Data Input	
30	GND		Module Ground	1

Notes:

1. Module ground pins (GND) are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7K-10K ohms to a voltage between 3.15V and 3.45V on the host board.

Menara Tunable XFP Supported Channels

Frequency	Wavelength	ITU Ch	Frequency	Wavelength	ITU Ch	Frequency	Wavelength	ITU Ch
196.15	1528.38	61.5	194.55	1540.95	45.5	192.95	1553.73	29.5
196.10	1528.77	61	194.50	1541.35	45	192.90	1554.13	29
196.05	1529.16	60.5	194.45	1541.75	44.5	192.85	1554.54	28.5
196.00	1529.55	60	194.40	1542.14	44	192.80	1554.94	28
195.95	1529.94	59.5	194.35	1542.54	43.5	192.75	1555.34	27.5
195.90	1530.33	59	194.30	1542.94	43	192.70	1555.75	27
195.85	1530.72	58.5	194.25	1543.33	42.5	192.65	1556.15	26.5
195.80	1531.12	58	194.20	1543.73	42	192.60	1556.55	26
195.75	1531.51	57.5	194.15	1544.13	41.5	192.55	1556.96	25.5
195.70	1531.90	57	194.10	1544.53	41	192.50	1557.36	25
195.65	1532.29	56.5	194.05	1544.92	40.5	192.45	1557.77	24.5
195.60	1532.68	56	194.00	1545.32	40	192.40	1558.17	24
195.55	1533.07	55.5	193.95	1545.72	39.5	192.35	1558.58	23.5
195.50	1533.47	55	193.90	1546.12	39	192.30	1558.98	23
195.45	1533.86	54.5	193.85	1546.52	38.5	192.25	1559.39	22.5
195.40	1534.25	54	193.80	1546.92	38	192.20	1559.79	22
195.35	1534.64	53.5	193.75	1547.32	37.5	192.15	1560.20	21.5
195.30	1535.04	53	193.70	1547.72	37	192.10	1560.61	21
195.25	1535.43	52.5	193.65	1548.11	36.5	192.05	1561.01	20.5
195.20	1535.82	52	193.60	1548.51	36	192.00	1561.42	20
195.15	1536.22	51.5	193.55	1548.91	35.5	191.95	1561.83	19.5
195.10	1536.61	51	193.50	1549.32	35	191.90	1562.23	19
195.05	1537.00	50.5	193.45	1549.72	34.5	191.85	1562.64	18.5
195.00	1537.40	50	193.40	1550.12	34	191.80	1563.05	18
194.95	1537.79	49.5	193.35	1550.52	33.5	191.75	1563.45	17.5
194.90	1538.19	49	193.30	1550.92	33	191.70	1563.86	17
194.85	1538.58	48.5	193.25	1551.32	32.5	191.65	1564.27	16.5
194.80	1538.98	48	193.20	1551.72	32	191.60	1564.68	16
194.75	1539.37	47.5	193.15	1552.12	31.5	191.55	1565.09	15.5
194.70	1539.77	47	193.10	1552.52	31	191.50	1565.50	15
194.65	1540.16	46.5	193.05	1552.93	30.5			
194.60	1540.56	46	193.00	1553.33	30			



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